



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁵ : F01M 11/03, F16N 39/06 B03C 1/28	A1	(11) International Publication Number: WO 92/05346 (43) International Publication Date: 2 April 1992 (02.04.92)
(21) International Application Number: PCT/GB90/01425 (22) International Filing Date: 14 September 1990 (14.09.90) (71)(72) Applicant and Inventor: HALL, Harold [GB/GB]; 31 South Drive, Flat 2, Liverpool L15 8JJ (GB). (74) Agent: SHAW, Laurence; George House, George Road, Edgbaston, Birmingham B15 1PG (GB). (81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE*, DE (European patent)*, DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), HU, IT (European patent), JP, KP, KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU*, TD (OAPI patent), TG (OAPI patent), US.		Published <i>With international search report.</i>
(54) Title: FILTER ACCESSORY (57) Abstract An accessory (20) to be sandwiched between an internal combustion engine and an oil filter (5) therefor, comprises a housing having an inlet (21), an outlet (22) and magnetic means (27) arranged so that oil flowing through the oil filter (5) also flows past the magnetic means (27) to collect any metal particles suspended within the oil.		

* DESIGNATIONS OF "DE"

Until further notice, any designation of "DE" in any international application whose international filing date is prior to October 3, 1990, shall have effect in the territory of the Federal Republic of Germany with the exception of the territory of the former German Democratic Republic.

+ DESIGNATIONS OF "SU"

Any designation of "SU" has effect in the Russian Federation. It is not yet known whether any such designation has effect in other States of the former Soviet Union.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	ES	Spain	MG	Madagascar
AU	Australia	FI	Finland	ML	Mali
BB	Barbados	FR	France	MN	Mongolia
BE	Belgium	GA	Gabon	MR	Mauritania
BF	Burkina Faso	GB	United Kingdom	MW	Malawi
BG	Bulgaria	GN	Guinea	NL	Netherlands
BJ	Benin	GR	Greece	NO	Norway
BR	Brazil	HU	Hungary	PL	Poland
CA	Canada	IT	Italy	RO	Romania
CF	Central African Republic	JP	Japan	SD	Sudan
CG	Congo	KP	Democratic People's Republic of Korea	SE	Sweden
CH	Switzerland	KR	Republic of Korea	SN	Senegal
CI	Côte d'Ivoire	LI	Liechtenstein	SU*	Soviet Union
CM	Cameroon	LK	Sri Lanka	TD	Chad
CS	Czechoslovakia	LU	Luxembourg	TG	Togo
DE*	Germany	MC	Monaco	US	United States of America
DK	Denmark				

FILTER ACCESSORY

The invention relates to a filter and more particularly to an accessory for use with a disposable oil filter of the type fitted to internal combustion engines and the like.

A conventional oil filter comprises an inlet and an outlet and a body of filtering material. A pressure relief valve may also be present which functions to bypass the filtering material in the event of a blockage. The trend towards longer service intervals on cars and the like means that such an event is more likely and can lead to the return of the filtered material to the engine. It is an advantage if especially metal particles are not returned to that engine. This is of especial importance in installations where the engine oil circulates with the gearbox, and many such particles are produced by wear of the gearbox components.

A conventional filtering arrangement of an internal combustion engine comprises an oil outlet in the form of a perforated wall on the sump. The oil return comprises a pipe which extends from within the engine through the perforated wall to protrude outside of the sump, where the pipe is externally threaded. The oil filter comprises a generally cylindrical housing having in one face inlet holes corresponding to the engine oil outlet holes. A

hole extends axially from that end face into the housing and the entrance thereof is internally threaded so that it may receive the oil return. In use, the filter is screwed on to the pipe and is sealed against the outer wall of the sump by means a resilient sealing ring on the end face of the filter.

According to a first aspect of the invention there is provided an accessory comprising a housing to be sandwiched between an internal combustion engine and an oil filter therefor, the housing including an inlet and an outlet and containing magnetic means arranged so that oil flowing through the oil filter also flows past the magnetic means, whereby particles suspended within the oil which are attracted by magnetic forces, are collected by the magnetic means.

Preferably the accessory comprises a short, open ended, cylindrical housing to be sealed between the wall of the sump of the engine and the adjacent end wall of the filter. A perforated wall preferably extends across within the housing and one or more magnets are secured to the wall. One of the perforated holes extends axially through the wall to receive the oil return pipe. The accessory is arranged so that oil flows from the engine into the housing and through the perforated wall before passing through the filter. The oil returns to the engine via the oil return pipe. Preferably the magnets are disposed on the downstream side of the wall and are arranged so that they do not

receive the full force of the oil flow which might otherwise scour or remove the adhered particles from the magnets.

In order that the invention may be better understood, it will now be described with reference to the accompanying diagrammatic drawings, in which:

Figure 1 is a cross-sectional view of an assembly including an accessory of the invention;

Figure 2 is a view from one end of the accessory shown in Figure 1, and

Figure 3 is a view from one end of an accessory according to another embodiment of the invention.

As shown in Figure 1, an oil sump 1 is part of an internal combustion engine fitted to a vehicle (not shown). A perforated wall portion of the sump 1 has a plurality of circumferentially spaced apart outlet holes 2. An oil return pipe 3 extends through the perforated wall portion between the spaced apart holes 2 from within the engine to the outside of the sump. The outermost portion of the pipe 3 has external threads 4.

An oil filter 5 of known type comprises a cylindrical housing 6 having a plurality of circumferentially spaced apart inlet holes

7 formed in one end face 8. A central outlet pipe 9 extends through the housing 6 and the end - portion 10 adjacent the end face 8 has internal threads 10. Holes 11 are present within the wall of the pipe 9. A body of filter material 12 is present between the inner wall of the housing 6 and the oil return pipe 9. A pressure relief valve 13 is present adjacent the remote end of the pipe 9. A resilient sealing ring 14 is retained in an annular channel 15 about the end face 8 of the housing 6.

An accessory according to the invention is interposed or sandwiched between the end face 8 of the oil filter and the wall of the sump.

The accessory comprises a short cylindrical body portion 20 having an inlet 21 and an outlet 22. A resilient sealing ring 23 is located within an annular channel 24 about the inlet end face 21 and in use seals against the wall of the sump 1. The outlet end face 22 of the accessory seals in use against the sealing ring 14 of the oil filter.

An internal wall 25 extends across the body portion 20 and has spaced apart holes 26. As shown in Figure 2, there are four pairs of holes 26, each pair being spaced apart from the neighbouring pair by an angle of 90°. Four spaced apart bar magnets are secured to the downstream side of the wall 25 and are arranged so that a pole of each magnet 27 is disposed adjacent an

outlet hole 26. A hole 28 extends centrally through the wall 25 to receive the oil return pipe 3.

The accessory may be fitted simply by placing the central hole 28 of the accessory over the oil return pipe 3 with the sealing ring 23 adjacent the sump wall 23, and with the magnets facing outwardly. The filter is threaded onto the oil pipe 3 and tightened until the sealing ring 14 seals against the end face 22 of the accessory, and the sealing ring 23 of the accessory seals against the wall of the sump 1.

In the embodiment shown in Figure 3, the inlet holes comprise three arcuate slots 30 circumferentially spaced about the transverse wall 31. These generally rod-like magnets 32 are present, each extending alongside and between the ends of a respective slot 30.

In use, oil flows from the sump 1 and through the holes 2 into the inlet 22, 30 of the accessory. The oil then flows through the holes 26, 30 in the wall 25, 31. Because the poles of the magnets 27, 32 are disposed adjacent the holes 26, 30 any magnetic particles released by, e.g. wear of the engine or transmission will be subject to a strong magnetic force and attracted to the magnets 27, 30. Because the magnets are disposed on the outlet or downstream side of the wall, they are not subjected to a scouring action caused by the flow of oil and

metal particles collected by the magnet 27, 32 adhere to the sides of magnet.

The oil then passes through the inlet holes 7 of the oil filter, the body of filter material 12 and the holes 11 to the oil return pipe 3, from where the oil is drawn back into the engine by means of an oil pump or the like (not shown). In the event of a blockage within the filter or due to a fault within the pressure relief valve 13, oil can pass from the inlet 7 directly through the relief valve 13 to the oil return pipe 3, without passing through the body of filter material 12. In such a case and where an accessory is fitted, the presence of the magnets ensures that at least a proportion of the ferrous material is not returned to the engine, where the ferrous material may cause damage to the bearing surfaces of the engine.

Because the accessory is formed as a separate item from the oil filter, it may be removed during an oil change and the ferrous matter removed from the magnet before replacement. Furthermore, because the magnets are not integrally formed within the filter, they need not be discarded during each oil change.

CLAIMS

1. An accessory comprising a housing to be sandwiched between an internal combustion engine and an oil filter therefor, the housing including an inlet and an outlet and including magnetic means arranged so that oil flowing through the filter also flows past the magnetic means, whereby particles suspended within the oil which are attracted by magnetic forces are collected by the magnetic means.
2. An accessory according to Claim 1, characterised in that the housing is generally cylindrical and includes a transverse wall including perforations defining the oil inlet, a hole extending axially through the wall to receive the oil return pipe of the engine to define the oil outlet, and at least one magnet is secured to the wall.
3. An accessory according to Claim 2, characterised in that the magnet is secured to the downstream side of the transverse wall.
4. An accessory according to Claim 2 or 3, characterised in that eight perforations are arranged in four side-by-side pairs circumferentially spaced about the wall, and the magnets are disposed in the spaces between the pairs of

perforations each pole of each magnet being located adjacent a respective perforation.

5. An accessory according to Claim 2 or 3, characterised in that three arcuate slots are circumferentially spaced about the transverse wall to define the oil inlet, and three magnets are mounted, each extending alongside and between the ends of one of the slots.
6. An accessory substantially as described with reference to the accompanying drawings.

1/1

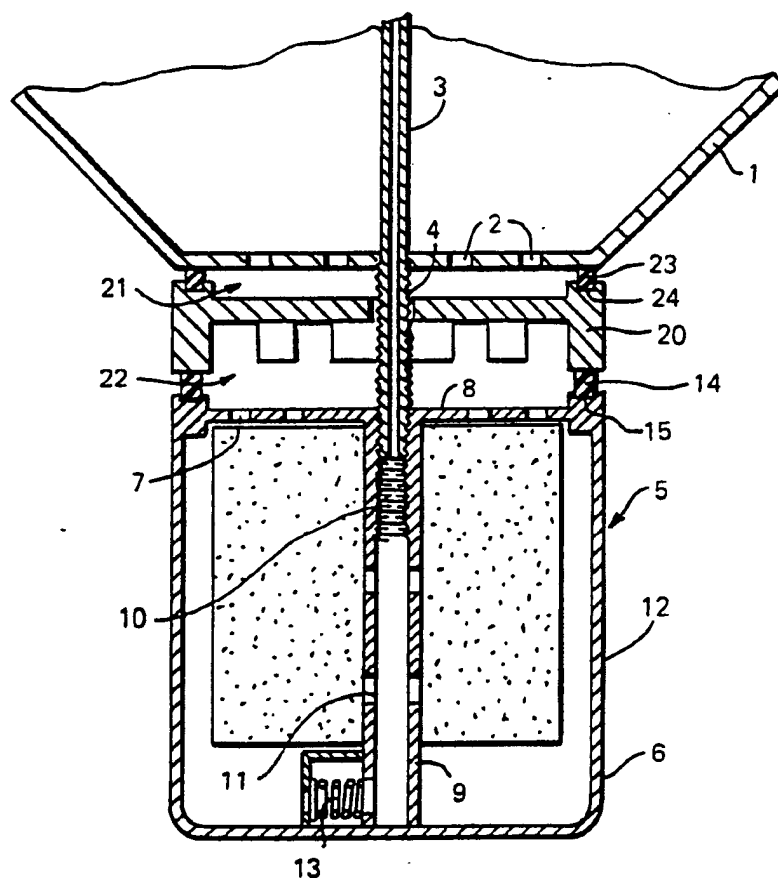


FIG.1

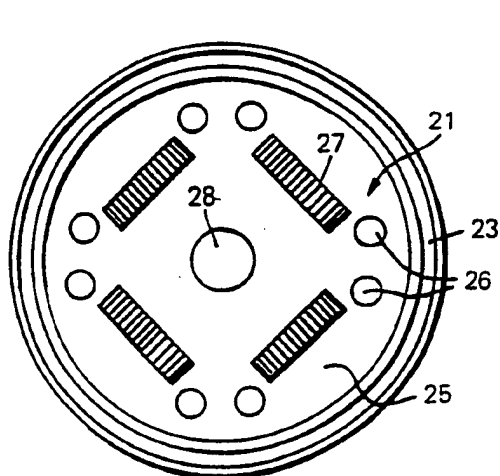


FIG.2

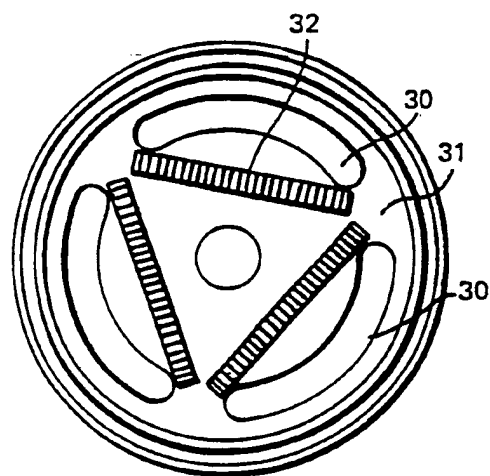


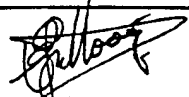
FIG.3

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 90/01425

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int.Cl. 5 F01M11/03 ; F16N39/06 ; B03C1/28		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	F01M ; F16N ; B03C	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with Indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	US,A,4450075 (KROW) 22 May 1984 see column 4, lines 5 - 30; figures	1, 2, 6
A	---	4, 5
E,X	GB,A,2229118 (HALL) 19 September 1990 see the whole document	1-6

<p>¹⁰ Special categories of cited documents :</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the International filing date</p> <p>"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the International filing date but later than the priority date claimed</p> <p>"T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"R" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
09 APRIL 1991	30 MAY 1991	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	KOOIJMAN F.G.M. 	

**ANNEX TO THE INTERNATIONAL SEARCH REPORT
ON INTERNATIONAL PATENT APPLICATION NO.**

PCT/GB 90/01425

SA 40414

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the European Patent Office EDP file on

The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information. 15/04/91

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-4450075	22-05-84	None	
GB-A-2229118	19-09-90	None	

EPO FORM P0479

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82